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**Recognising Contributions to Work in Research Collaboratives: Guidelines For
Standardising Reporting of Authorship in Collaborative Research.**

On behalf of the National Research Collaborative & Association of Surgeons in Training
Collaborative Consensus Group*

*Authorship presented in Appendix 1, contributions to paper presented in Appendix 2

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Keywords: Authorship, Surgery, Collaboration

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Abstract

Background: Trainee research collaboratives (TRCs) have been revolutionary changes to the delivery of high-quality, multicentre research. The aim of this study was to define common roles in the conduct of collaborative research, and map these to academic competencies as set out by General Medical Council (GMC) in the United Kingdom. This will support trainers and assessors when judging academic achievements of those involved in TRC projects, and supports trainees by providing guidance on how to fulfil their role in these studies.

Methods: A modified Delphi process was followed. Electronic discussion with key stakeholders was undertaken to identify and describe common roles. These were refined and mapped to GMC educational domains and International Committee of Medical Journal Editors authorship (ICJME) guidelines. The resulting roles and descriptions were presented to a face-to-face consensus meeting for voting. The agreed roles were then presented back to the electronic discussion group for approval.

Results: Electronic discussion generated six common roles. All of these were agreed in face-to-face meetings, where two further roles identified and described. All eight roles required skills that map to part of the academic requirements for surgical training in the UK.

Discussion: This paper presents a standardised framework for reporting authorship in collaborative group authored research publications. Linkage of collaborator roles

to the ICMJE guidelines and GMC academic competency guidelines will facilitate incorporation into relevant training curricular and journal publication policies.

Background

There has been a recent shift towards a collaborative research model in surgery with the advent of the Trainee Research Collaboratives (TRCs). Briefly, this describes 'snap-shot', protocol-driven, pragmatic multicentre research undertaken by multiple groups of trainees across a network during a limited time frame¹. Trainees gain significant experience in the academic and non-academic competencies whilst taking part in TRC work. The TRCs trainees can lead or contribute to high quality studies that influence clinical practice and improve patient care. This has been recognised by journal editors and peer reviewers, who have accepted work from the TRCs for publication in high impact journals²⁻⁵. Traditionally, clinical surgical research has been of limited quality, with a number of procedures and processes based on 'single surgeon, single centre' case series, or expert opinion⁶. In promoting multicentre collaboration, the TRC studies improve the size and power of studies, bringing greater clinical relevance, better generalisability and supporting training and professional development.

A key quality of a doctor is the ability to contribute to research for the benefit of their patients' care. Indeed, research competencies and the ability to understand and critically analyses medical literature are fundamental for good clinical practice internationally. Requirements to complete postgraduate training and obtain a

Certificate of Completion of Training (CCT) in the UK include demonstration of academic competencies as set out by the General Medical Council (GMC). The exact demonstration of these competencies varies between specialties. Surgical specialties quantify a specific number of publications: for example, the **Joint Committee on Surgical Training (JCST)/Specialty Advisory Committee (SAC)** guidelines for certification in General Surgery requires publication of three peer-reviewed papers in PubMed-indexed journals before CCT is awarded. The contribution of the trainee to the paper must have been “significant”. For traditional research paradigms, assessment of the trainee’s contribution is relatively straightforward, for example if they are the first author. However, with the advent of the Trainee Research Collaboratives (TRCs), there are new challenges in nomenclature and defining a “significant” contribution mapped to GMC academic requirements.

Collaborative research offers opportunity to improve the quality and quantity of surgical research that is now being undertaken, and it has challenged the traditional schemata for nomenclature of authorship. As such, a new nomenclature system for studies conducted by TRCs has evolved⁵, without formal validation against existing guidelines. The International Committee of Medical Journal editors (ICMJE) lays out four criteria for an individual to meet for which to be recognised as a named author⁷:

1. Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
2. Drafting the work or revising it critically for important intellectual content;
AND

3. Final approval of the version to be published; AND
4. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Although the collaborative authorship structure reflects that used by large, publicly-funded, multicentre clinical trials⁸, it is not widely accepted as evidence of research activity by training bodies in surgery, throughout the postgraduate training pathway⁹. One of the principal concerns about recognising TRC research may be the lack of transparency about individual trainees' contributions and the attainment of domains in the GMC competencies framework, rather than a perceived lack of value. The adoption of standardised role descriptions and terminology for the collaborative research model, with mapping to GMC educational domains and ICMJE authorship guidelines should address this.

Method

A working group from the National Research Collaborative and Association of Surgeons in Training prepared a consensus document using a modified Delphi process (Figure 1).

The principal modification of the Delphi technique was related to generation of roles and descriptors for subsequent voting. As these had to map to existing guidelines and frameworks, proposed items for consensus were confined to tight domains and definitions. Current practices in reporting of authorship in collaborative research projects were canvassed from the leads of national and regional groups through electronic discussion, throughout March 2017. The CREDIT taxonomy informed discussion around this document as it i) demonstrated the authorship model was acceptable to journal editors and ii) demonstrated common roles and descriptors albeit with a laboratory focus¹⁰. The GMC descriptors were made available for the first round of discussion (Appendix 3).

The reported roles and structures of TRC research were synthesised into a common nomenclature. This nomenclature was reviewed by the consensus meeting and refined following discussion. Agreed roles were mapped to GMC educational domains and presented back to the electronic group.

A face-to-face consensus session was held at the Association of Surgeons' in Training (ASiT) International Conference in April 2017. The voting session was advertised in advance and was open to all surgical consultants and trainees across all surgical

specialities. This included presentation of the proposed framework with supporting discussion. Votes were held on agreement with roles and descriptors, with acceptance set at 80% agreement for inclusion in the consensus, as previously described¹¹. Each role name, task list, and GMC descriptors were voted on and approved. The applicability of these roles to different research methods (e.g. randomised trial or cohort study), and typically expected tasks for each role were discussed. The description and scope of the roles were simplified following discussion. Confirmation that these roles mapped to ICJME criteria was obtained.

Voting was undertaken anonymously using a bespoke smartphone voting app. After the first round of voting, a discussion was held to address queries and discuss reasons for voting, prior to the second anonymous vote. If consensus was not reached at the second vote, vote moderators explored whether achievement of consensus was likely or not through discussion with the room. If it was possible to achieve consensus through minor modification of wording then this was offered to the group for consensus. If it was considered that a statement would require significant modification or was not acceptable to the group, it was discarded.

Results

Electronic discussion generated a list of six generic roles in collaborative research. The applicability of these roles to different research methods (e.g. randomised trial or cohort study), and typically expected tasks for each role were discussed. The panel mapped these to the relevant educational domains and a preliminary framework was developed. The makeup of groups consulted in the electronic discussion and face to face consensus is presented in table 1.

The resulting framework was presented at the ASiT 2017 meeting to a consensus group of 25 delegates, all of whom had engaged with collaborative research. Two further roles: data analysis and advisory group were proposed during the meeting, and **agreed by subsequent electronic discussion**. The final eight roles and descriptors are listed here, summarised in Table 2.

Steering committee: Agree/Strongly Agree 93%

A member of the steering committee is involved in the conception, development, administration and delivery of a study. They will typically be involved in study design, development of tools, preparation of the protocol, and dissemination plan. They will have in depth understanding of governance and research principles behind the study. The steering group will have critically appraised the literature in order to understand appropriate study methods and relevant data points.

GMC Educational Domains: 1-6

ICMJE Adherent: Yes

Writing group: Agree/Strongly Agree 88%

The writing group is responsible for reviewing existing evidence, assessing and/or analysing data from the project, and preparing a manuscript for publication. In order to do so, they will have critically appraised the literature and synthesised knowledge in context of project findings.

GMC Educational Domains: 1-6

ICMJE Adherent: Yes

Regional lead: Agree/Strongly Agree 89%

Not all studies will require a regional lead and it is likely to be an 'optional' role depending on the structure of the study. Large multi-centre national studies often require individuals at a regional level to coordinate centres in that region to take part in the study. The regional lead is involved in the recruitment and support of participating sites. They share information between regions and the steering group. These individuals need to have an understanding of the research governance processes in order to open the study at local sites. The regional leads will be circulated summaries of analyses, and be required to approve a final manuscript for submission ahead of peer-review.

GMC Educational Domains: 3-4

ICMJE Adherent: Yes

Local lead: Agree/Strongly Agree 88%

The local lead is responsible for hospital or trust level co-ordination. They identify and confirm the names of local collaborators and support the named local clinician (where applicable). They should ensure that an appropriate number of local collaborators are involved and listed accordingly in any documentation. A key role of the local lead is to ensure local clinical governance approvals are obtained and adhered to. They should also ensure that the findings of the study are presented locally, or have a date arranged for local presentation, as part of audit sign-off. They are usually involved in collecting data for the project. Similarly, the local leads will be circulated summaries of analyses, and be required to approve a final manuscript for submission ahead of peer-review.

GMC Educational Domains: 3-4

ICMJE Adherent: Yes

Local collaborator: Agree/Strongly Agree 94%

Local collaborators are responsible for the collection and return of data during the study. Each site may have more than one local collaborator. As well as trainees, a local consultant providing oversight to the group may be listed as a local collaborator. The collaborator will be familiar with the study protocol and operate within local governance frameworks and approvals. Depending on the nature of the study, eligible patient numbers may vary. It is important that this is recognised by each steering group and targets adjusted accordingly. A final manuscript is circulated and reviewed by local collaborators ahead of peer-review.

GMC Educational Domains: 3-4

ICMJE Adherent: Yes

Data validator: Agree/Strongly Agree 95%

A data validator is typically involved in confirming case ascertainment and establishing data accuracy. This should ideally be someone who is independent from the data collection phase. The validator will be familiar with the study protocol and operate within local governance frameworks and approvals. Depending on the nature of the study, eligible patient numbers may vary. It is important that this is recognised by each steering group and targets adjusted accordingly. Similarly, a final manuscript is circulated and reviewed by local collaborators ahead of peer-review.

GMC Educational Domains: 3-4

ICMJE Adherent: Yes

Data Analysis Group:

This is someone who may be involved in formulating the statistical analysis plan and/or uses the data produced in a study to summarise results, carry out statistical tests and draw conclusions, ready for presentation or publication.

Educational domains: 1,3,5

ICMJE Adherent: Yes

Advisory group: Agreed outside voting session.

This is someone who provides expert advice on the design and feasibility of a collaborative project. This includes pre-publication peer review, expert advice and guidance.

Educational domains: 1-6

ICMJE Adherent: Yes

Discussion

This paper presents a standardised framework for reporting authorship in collaborative group authored research publications. Linkage of collaborator roles to the International Committee of Medical Journal Editors (ICMJE) authorship guidelines and General Medical Council academic competency guidelines will facilitate incorporation into relevant training curricula and journal publication policies.

Whilst different levels of collaboration lead to different levels of educational attainment, collaborators that make a significant contribution to acquisition or analysis of data, should have the opportunity to critically review a manuscript, approve the final version before publication, and agreement to be accountable for all aspects of the work, as per ICMJE guidelines⁷.

How to use these guidelines

The roles described here are those typically adopted in primary research studies undertaken using a collaborative research framework¹. Not all projects will require collaborators in every role, therefore this should not be seen as mandatory structure and should be adapted as groups see fit. It is likely that over time, the nature of these roles will change as research questions build in complexity, and interdisciplinary collaborations evolve. At this point, collaboratives should repeat this exercise to redefine roles, or describe new ones.

Whilst the group encourages a single corporate authorship policy, collaboratives may choose to have headline authorship for some of their writing group. In either setting, collaborators should be acknowledged through a statement '*on behalf of the ABC collaborative/ABC collaborators*'. Collaborators should be listed in Appendix A, grouped by the role that they fulfilled, by their region and by their centre. Collaborators may fulfil more than one role and can be listed multiple times accordingly. There should be a discussion with any journal ahead of submission for peer-review to ensure that collaborators will be PubMed indexed under the collaborative corporate author, and therefore citable. In order to adjust to print runs and size requirements, the appendix may need to be printed in small text, or as online only data.

When citing collaborative work on a CV, the format 'Last name First initial. (Role) Collaborative Group (Year published). Article title. Journal, Volume (Issue), Page(s).'

should be used. For example:

Smith, S. (Regional Lead) National Research Collaborative (2017). Recognising Contributions to Work in Research Collaboratives. Journal of Example Medicine, 1(35), 399-406.

Following the framework set out by this document will allow readers to understand the contribution that trainees have made to a project, and the skills demonstrated during research activities. This document can therefore support trainers and assessors when making a judgment about the academic achievements of trainees. Robust reporting of roles with mapping to educational outcomes should reassure trainers that those engaging in collaborative research are doing more than simply

‘collecting data’. Appropriate recognition and reward of these roles will ensure collaborative research remains a viable model for rapid and efficient delivery of high-quality, multicentre research data to improve patient care.

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Figures and Tables

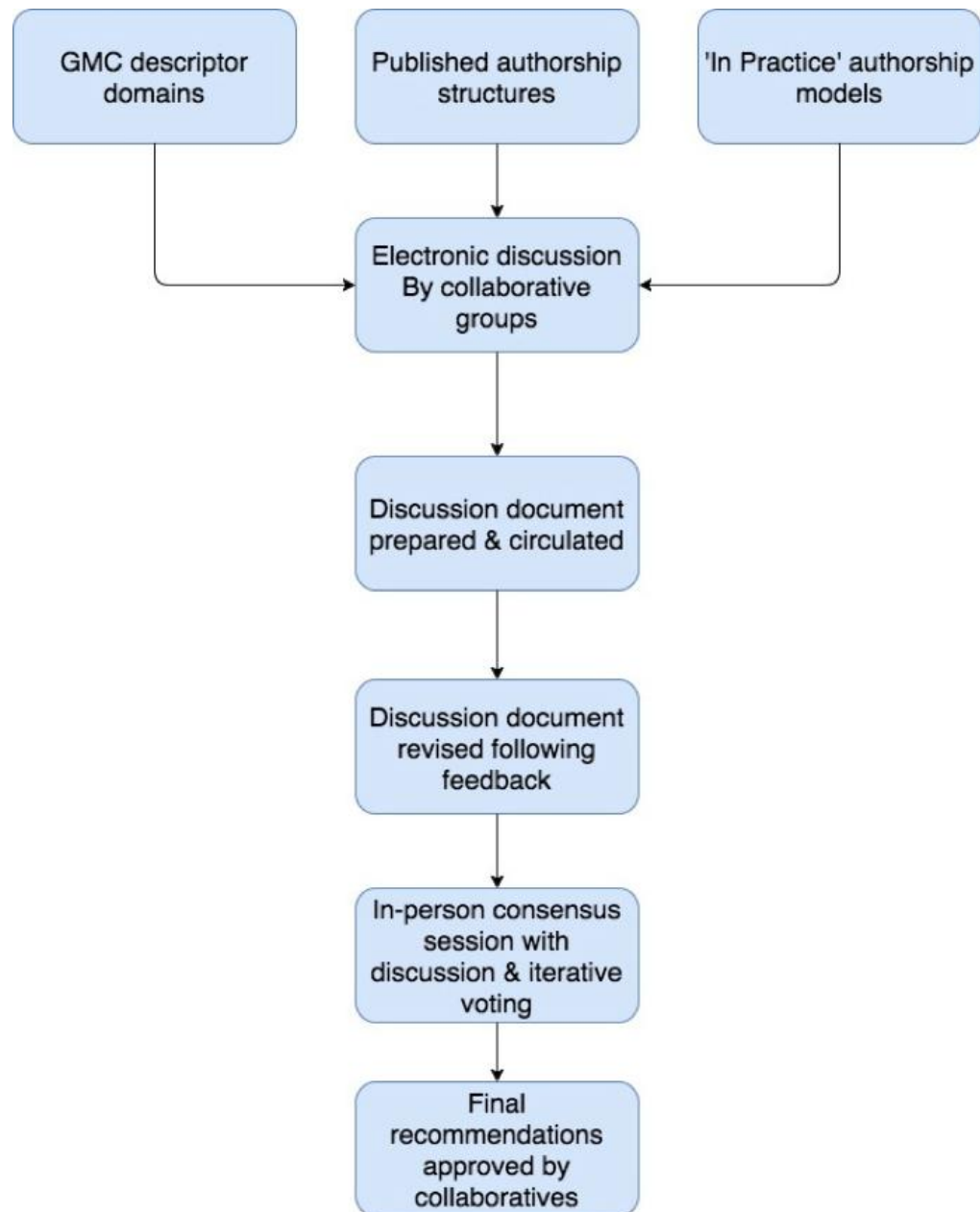


Figure 1: Consensus Process

Specialty groups/collaboratives represented in online discussion	Specialty groups/collaboratives represented in consensus meeting
<p>Association of Surgeons in Training (ASiT)</p> <p>Birmingham Clinical Trials Unit</p> <p>Bristol Trials Unit/ConDuCT-II Hub</p> <p>British Orthopaedic Trainee Association (BOTA)</p> <p>Cardiothoracic Trainees Research Group (CTRG)</p> <p>Carrel Club Research Collaborative</p> <p>East Midlands Surgical Academic Network (EMSAN)</p> <p>KSS Surgeons Research Collaborative</p> <p>London Surgical Research Group (LSRG)</p> <p>North-West Research Collaborative (NWRC)</p> <p>Northern Ireland Research Collaborative (NIRC)</p> <p>Northern Surgical Trainees Research Association (NoSTRA)</p> <p>Oxford Surgical Collaborative in Audit and Research (OxSCAR)</p> <p>Reconstructive Surgery Trials Research Network (RSTN)</p> <p>South Yorkshire Surgical Research Group (SYSuRG)</p> <p>Vascular and Endovascular Research Network (VERN)</p> <p>Welsh Barbers Research Collaborative (Barbers)</p> <p>Welsh Ophthalmic Research Collaborative</p> <p>West Midlands Research Collaborative (WMRC)</p> <p>Yorkshire Surgical Research Collaborative (YSRC)</p>	<p>Association of Surgeons in Training (ASiT)</p> <p>British Neurosurgery Trainee Research Collaborative (BNTRC)</p> <p>British Urology Researchers in Surgical Training (BURST)</p> <p>European Research Collaborative (EUROSurg)</p> <p>Global Surgery Research Collaborative (GLOBALSurg)</p> <p>North-West Research Collaborative (NWRC)</p> <p>Northern Ireland Research Collaborative (NIRC)</p> <p>Scottish Surgical Research Group (SSRG)</p> <p>South Yorkshire Surgical Research Group (SYSuRG)</p> <p>Southern and Peninsula Audit and Research Collaborative for Surgeons (SPARCS)</p> <p>Student Audit and Research In Surgery (STARSURG)</p> <p>Welsh Barbers Research Collaborative (Barbers)</p> <p>Wessex Research Collaborative (WRC)</p> <p>West Midlands Research Collaborative (WMRC)</p>

Table 1: Groups represented in consensus meeting

Role	Example Role Responsibilities	Corresponding GMC domains	ICJME Criteria
Steering Committee <i>(common to all manuscripts resulting from the project)</i>	<p>Involved in the overall organisation of the project</p> <p>Instrumental in the conception, development and administration of the project</p> <p>Designs and administers the data collection tools</p> <p>Cleans data and prepares it for analysis</p> <p>Provides regular critical review of the study plan and protocol</p> <p>Oversees the dissemination plan for results of the project</p>	1-6	1-4
Writing Group <i>(specific to individual manuscripts)</i>	<p>Reviews existing evidence-base relevant to this manuscript</p> <p>Significant contribution of original work to one or more sections of the manuscript</p> <p>Critically reviews and edits the manuscript</p>	1-6	1-4
Regional Lead <i>(common to all manuscripts resulting from the project)</i>	<p>Recruits and/or manages day to day queries from Local Leads and Local Collaborator within their geographic region</p> <p>Responsible for disseminating the project and recruiting centres within their region</p> <p>Geographic regions may reflect the boundaries of training bodies or existing regional collaboratives. Larger studies may have more than one Regional Lead per region</p> <p>Responsible for presenting study at regional educational and research meetings</p>	3-4	1-4

Local Lead <i>(common to all manuscripts based on data that their centre submitted)</i>	Leads the project within a single institution (this may be a single hospital or an organisation composed of several hospitals) Recruits and manage Local Collaborators Ensures that all relevant consultants within the institution are aware of the study Liaises with local consultant to arrange local registration and approval for the study Presents study at local departmental and hospital meetings	3-4	1-4
Local Collaborator <i>(common to all manuscripts based on data that their centre submitted)</i>	Role is to collect the data for the study. This may involve identification of patients, consenting, randomisation, applying an intervention, data collection, arranging and performing follow-up for patients May be required to recruit or collect data on a specified number of patients or over a pre-specified data collection period	3-4	1-4
Data Validator <i>(common to all manuscripts based on data that their centre submitted)</i>	Reviews a selection of patients or data points from their centre to ensure protocol compliance Reviews patient records to ensure that accurate and complete data has been collected Typically not involved in the original data collection	3-4	1-4
Data Analysis	Formulates the statistical analysis plan and/or uses the data produced in a study to summarise results, carry out statistical tests and draw conclusions.	1,3,5	1-4
Advisory Group	Subject expert who advises on protocol design and study conduct. This may also include pre-publication peer review	1-6	1-4

Table 2: Consensus roles and definitions

Appendix 3: Broad GMC educational descriptor domains

- 1) Demonstrate evidence-based practice.
- 2) Understand how to critically appraise literature.
- 3) Understand and apply basic research principles.
- 4) Understand basic principles of research governance and how they should apply relevant ethical guidelines to research activities.
- 5) Draw from public health epidemiology and other data sources.
- 6) Conduct a literature search and review.

Appendix 4: Change in voting patterns across voting rounds

Role	% Agree/Strongly Agree Round 1	% Agree/Strongly Agree Round 2
Steering Committee	85%	93%
Writing Group	90%	88%
Regional Lead	93%	89%
Local Lead	93%	88%
Local Collaborator	96%	94%
Data Validator	88%	95%

Changes in votes of agreement between round 1 & 2 of voting.

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advance and was open to all surgical consultants and trainees across all surgical specialities. The applicability of these roles to different research methods (e.g. randomised trial or cohort study), and typically expected tasks for each role were discussed. The description and scope of the roles were simplified following discussion. Confirmation that these roles mapped to ICJME criteria was obtained.

Results

Electronic discussion generated a list of six generic roles in collaborative research. The applicability of these roles to different research methods (e.g. randomised trial or cohort study), and typically expected tasks for each role were discussed. The panel mapped these to the relevant educational domains and a preliminary framework was developed. The makeup of groups consulted in the electronic discussion and face to face consensus is presented in table 1.

The resulting framework was presented at the ASiT 2017 meeting to a consensus group of 25 delegates, all of whom had engaged with collaborative research. Two further roles: data analysis and advisory group were proposed during the meeting. The final eight roles and descriptors are listed here, summarised in Table 2.

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GMC Educational Domains: 1-6

ICMJE Adherent: Yes

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The writing group is responsible for reviewing existing evidence, assessing and/or analysing data from the project, and preparing a manuscript for publication. In order to do so, they will have critically appraised the literature and synthesised knowledge in context of project findings.

GMC Educational Domains: 1-6

ICMJE Adherent: Yes

Regional lead:

Not all studies will require a regional lead and it is likely to be an 'optional' role depending on the structure of the study. Large multi-centre national studies often require individuals at a regional level to coordinate centres in that region to take part in the study. The regional lead is involved in the recruitment and support of participating sites. They share information between regions and the steering group. These individuals need to have an understanding of the research governance processes in order to open the study at local sites. The regional leads will be circulated summaries of analyses, and be required to approve a final manuscript for submission ahead of peer-review.

GMC Educational Domains: 3-4

ICMJE Adherent: Yes

Local lead:

The local lead is responsible for hospital or trust level co-ordination. They identify and confirm the names of local collaborators and support the named local clinician

(where applicable). They should ensure that an appropriate number of local collaborators are involved and listed accordingly in any documentation. A key role of the local lead is to ensure local clinical governance approvals are obtained and adhered to. They should also ensure that the findings of the study are presented locally, or have a date arranged for local presentation, as part of audit sign-off. They are usually involved in collecting data for the project. Similarly, the local leads will be circulated summaries of analyses, and be required to approve a final manuscript for submission ahead of peer-review.

GMC Educational Domains: 3-4

ICMJE Adherent: Yes

Local collaborator:

Local collaborators are responsible for the collection and return of data during the study. Each site may have more than one local collaborator. As well as trainees, a local consultant providing oversight to the group may be listed as a local collaborator. The collaborator will be familiar with the study protocol and operate within local governance frameworks and approvals. Depending on the nature of the study, eligible patient numbers may vary. It is important that this is recognised by each steering group and targets adjusted accordingly. A final manuscript is circulated and reviewed by local collaborators ahead of peer-review.

GMC Educational Domains: 3-4

ICMJE Adherent: Yes

Data validator:

A data validator is typically involved in confirming case ascertainment and establishing data accuracy. This should ideally be someone who is independent from the data collection phase. The validator will be familiar with the study protocol and operate within local governance frameworks and approvals. Depending on the nature of the study, eligible patient numbers may vary. It is important that this is recognised by each steering group and targets adjusted accordingly. Similarly, a final manuscript is circulated and reviewed by local collaborators ahead of peer-review.

GMC Educational Domains: 3-4

ICMJE Adherent: Yes

Data Analysis Group

This is someone who may be involved in formulating the statistical analysis plan and/or uses the data produced in a study to summarise results, carry out statistical tests and draw conclusions, ready for presentation or publication.

Educational domains: 1,3,5

ICMJE Adherent: Yes

Advisory group:

This is someone who provides expert advice on the design and feasibility of a collaborative project. This includes pre-publication peer review, expert advice and guidance.

Educational domains: 1-6

ICMJE Adherent: Yes

Discussion

This paper presents a standardised framework for reporting authorship in collaborative group authored research publications. Linkage of collaborator roles to the International Committee of Medical Journal Editors (ICMJE) authorship guidelines and General Medical Council academic competency guidelines will facilitate incorporation into relevant training curricula and journal publication policies.

Whilst different levels of collaboration lead to different levels of educational attainment, collaborators that make a significant contribution to acquisition or analysis of data, should have the opportunity to critically review a manuscript, approve the final version before publication, and agreement to be accountable for all aspects of the work, as per ICMJE guidelines⁷.

How to use these guidelines

The roles described here are those typically adopted in primary research studies undertaken using a collaborative research framework¹. Not all projects will require collaborators in every roles, therefore this should not be seen as mandatory structure and should be adapted as groups see fit. It is likely that over time, the nature of these roles will change as research questions build in complexity, and interdisciplinary collaborations evolve. At this point, collaboratives should repeat this exercise to redefine roles, or describe new ones.

Whilst the group encourages a single corporate authorship policy, collaboratives may choose to have headline authorship for some of their writing group. In either setting, collaborators should be acknowledged through a statement '*on behalf of the ABC collaborative/ABC collaborators*'. Collaborators should be listed in Appendix A, grouped by the role that they fulfilled, by their region and by their centre. Collaborators may fulfil more than one role and can be listed multiple times accordingly. There should be a discussion with any journal ahead of submission for peer-review to ensure that collaborators will be PubMed indexed under the collaborative corporate author, and therefore citable. In order to adjust to print runs and size requirements, the appendix may need to be printed in small text, or as online only data.

When citing collaborative work on a CV, the format 'Last name First initial. (Role) Collaborative Group (Year published). Article title. Journal, Volume (Issue), Page(s).'

should be used. For example:

Smith, S. (Regional Lead) National Research Collaborative (2017). Recognising Contributions to Work in Research Collaboratives. Journal of Example Medicine, 1(35), 399-406.

Following the framework set out by this document will allow readers to understand the contribution that trainees have made to a project, and the skills demonstrated during research activities. This document can therefore support trainers and assessors when making a judgment about the academic achievements of trainees. Robust reporting of roles with mapping to educational outcomes should reassure trainers that those engaging in collaborative research are doing more than simply

‘collecting data’. Appropriate recognition and reward of these roles will ensure collaborative research remains a viable model for rapid and efficient delivery of high-quality, multicentre research data to improve patient care.

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Figures and Tables

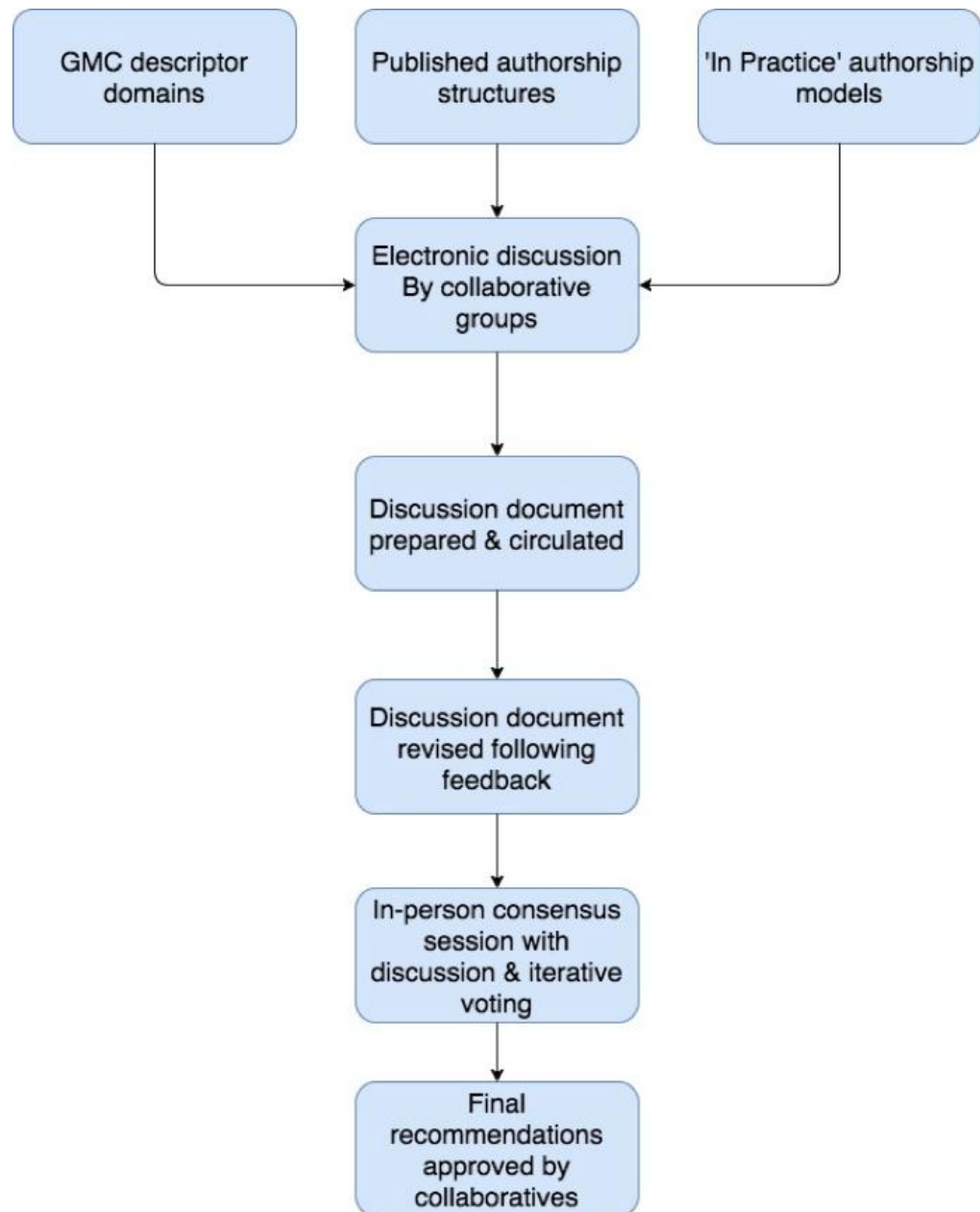


Figure 1: Consensus Process

Specialty groups/collaboratives represented in online discussion	Specialty groups/collaboratives represented in consensus meeting
<p>Association of Surgeons in Training (ASiT)</p> <p>Birmingham Clinical Trials Unit</p> <p>Bristol Trials Unit/ConDuCT-II Hub</p> <p>British Orthopaedic Trainee Association (BOTA)</p> <p>Cardiothoracic Trainees Research Group (CTRG)</p> <p>Carrel Club Research Collaborative</p> <p>East Midlands Surgical Academic Network (EMSAN)</p> <p>KSS Surgeons Research Collaborative</p> <p>London Surgical Research Group (LSRG)</p> <p>North-West Research Collaborative (NWRC)</p> <p>Northern Ireland Research Collaborative (NIRC)</p> <p>Northern Surgical Trainees Research Association (NoSTRA)</p> <p>Oxford Surgical Collaborative in Audit and Research (OxSCAR)</p> <p>Reconstructive Surgery Trials Research Network (RSTN)</p> <p>South Yorkshire Surgical Research Group (SYSuRG)</p> <p>Vascular and Endovascular Research Network (VERN)</p> <p>Welsh Barbers Research Collaborative (Barbers)</p> <p>Welsh Ophthalmic Research Collaborative</p> <p>West Midlands Research Collaborative (WMRC)</p> <p>Yorkshire Surgical Research Collaborative (YSRC)</p>	<p>Association of Surgeons in Training (ASiT)</p> <p>British Neurosurgery Trainee Research Collaborative (BNTRC)</p> <p>British Urology Researchers in Surgical Training (BURST)</p> <p>European Research Collaborative (EUROSurg)</p> <p>Global Surgery Research Collaborative (GLOBALSurg)</p> <p>North-West Research Collaborative (NWRC)</p> <p>Northern Ireland Research Collaborative (NIRC)</p> <p>Scottish Surgical Research Group (SSRG)</p> <p>South Yorkshire Surgical Research Group (SYSuRG)</p> <p>Southern and Peninsula Audit and Research Collaborative for Surgeons (SPARCS)</p> <p>Student Audit and Research In Surgery (STARSURG)</p> <p>Welsh Barbers Research Collaborative (Barbers)</p> <p>Wessex Research Collaborative (WRC)</p> <p>West Midlands Research Collaborative (WMRC)</p>

Table 1: Groups represented in consensus meeting

Role	Example Role Responsibilities	Corresponding GMC domains	ICJME Criteria
Steering Committee <i>(common to all manuscripts resulting from the project)</i>	<p>Involved in the overall organisation of the project</p> <p>Instrumental in the conception, development and administration of the project</p> <p>Designs and administers the data collection tools</p> <p>Cleans data and prepares it for analysis</p> <p>Provides regular critical review of the study plan and protocol</p> <p>Oversees the dissemination plan for results of the project</p>	1-6	1-4
Writing Group <i>(specific to individual manuscripts)</i>	<p>Reviews existing evidence-base relevant to this manuscript</p> <p>Significant contribution of original work to one or more sections of the manuscript</p> <p>Critically reviews and edits the manuscript</p>	1-6	1-4
Regional Lead <i>(common to all manuscripts resulting from the project)</i>	<p>Recruits and/or manages day to day queries from Local Leads and Local Collaborator within their geographic region</p> <p>Responsible for disseminating the project and recruiting centres within their region</p> <p>Geographic regions may reflect the boundaries of training bodies or existing regional collaboratives. Larger studies may have more than one Regional Lead per region</p> <p>Responsible for presenting study at regional educational and research meetings</p>	3-4	1-4

Local Lead <i>(common to all manuscripts based on data that their centre submitted)</i>	Leads the project within a single institution (this may be a single hospital or an organisation composed of several hospitals) Recruits and manage Local Collaborators Ensures that all relevant consultants within the institution are aware of the study Liaises with local consultant to arrange local registration and approval for the study Presents study at local departmental and hospital meetings	3-4	1-4
Local Collaborator <i>(common to all manuscripts based on data that their centre submitted)</i>	Role is to collect the data for the study. This may involve identification of patients, consenting, randomisation, applying an intervention, data collection, arranging and performing follow-up for patients May be required to recruit or collect data on a specified number of patients or over a prespecified data collection period	3-4	1-4
Data Validator <i>(common to all manuscripts based on data that their centre submitted)</i>	Reviews a selection of patients or data points from their centre to ensure protocol compliance Reviews patient records to ensure that accurate and complete data has been collected Typically not involved in the original data collection	3-4	1-4
Data Analysis	Formulates the statistical analysis plan and/or uses the data produced in a study to summarise results, carry out statistical tests and draw conclusions.	1,3,5	1-4
Advisory Group	Subject expert who advises on protocol design and study conduct. This may also include pre-publication peer review	1-6	1-4

Table 2: Consensus roles and definitions

Appendix 3: Broad GMC educational descriptor domains

- 1) Demonstrate evidence-based practice.
- 2) Understand how to critically appraise literature.
- 3) Understand and apply basic research principles.
- 4) Understand basic principles of research governance and how they should apply relevant ethical guidelines to research activities.
- 5) Draw from public health epidemiology and other data sources.
- 6) Conduct a literature search and review.

Appendix 1 Authorship Consensus Group (all names to be Pubmed citable):

Natalie Blencowe, James Glasbey, Nick Heywood, Veeru Kasivisvanathan, Matthew Lee, Dmitri Nepogodiev, Richard Wilkin, Sophie Allen, Aditya Borakati, David Bosanquet, Stephen Chapman, Aswin Chari, Matt Dunstan, Edward Dyson, Ellie Edlmann, Matthew D Gardner, Rhiannon Harries, James Hunter, Angelos G Kolias, Aimun Jamjoom, John McGrath, Helen Mohan, Rory Morrison, Gael Nana, Ana-Catarina Pinho-Gomes, Scott McCain, Ana-Catarina Pinho-Gomes, Rhianon Reynolds, Shafaque Sheikh, Joseph Shalhoub, Amy Stimpson, Nicholas Symons. Gijs van Boxel, Malcolm West, Jonathan Wild, Daniel Baker, Behrad Barmayehvar, Michael Bath, Andrew J Beamish, Aneel Bhangu, Richard Canter, Joshua Clements, Arthur Cotton, Nedal Dabab, Daniel Doherty, J Edward Fitzgerald, Emily Heywood, Maximilian Johnston, Patrick Hickland, Sivesh Kamarajah, Chris Hoo, Jack Marshall, Kenneth McClean, Rachael Morley, Nisaharan Srikandarajah, Simon Fleming, Nathan Stephens, Alex Ward, Ibrahim Yasin, Tariq Yasin, Dion Morton, Jane Blazeby, Tom Pinkney, Amar Rangan, Simon Bach, Adam Williams

Appendix 2: Statement of Contributions

Steering Group:

Natalie Blencowe, James Glasbey, Matthew Lee

Writing group:

Natalie Blencowe, James Glasbey, Nick Heywood, Veeru Kasivisvanathan, Matthew Lee, Helen Mohan, Dmitri Nepogodiev, Richard Wilkin

Consensus exercise participants:

Daniel Baker, Behrad Barmayehvar, Michael Bath, Andrew J Beamish, Aneel Bhangu, Richard Cantor, Joshua Clements, Arthur Cotton, Nedal Dabab, Daniel Doherty, J Edward Fitzgerald, Emily Heywood, Maximilian Johnston, Patrick Hickland, Sivesh Kamarajah, Chris Hoo, Jack Marshall, Kenneth McClean, Rachael Morley, Nisaharan Srikandarajah, Nathan Stephens, Alex Ward, Ibrahim Yasin, Tariq Yasin,

Electronic consultation participants:

Sophie Allen, Simon Bach, Jane Blazeby, Aditya Borakati, David Bosanquet, Stephen Chapman, Aswin Chari, Matt Dunstan, Edward Dyson, Ellie Edlmann , Matthew D Gardner, Rhiannon Harries, James Hunter, Angelos G Kolias, Aimun Jamjoom, John McGrath, Helen Mohan, Rory Morrison, Dion Morton, Gael Nana, Tom Pinkney, Ana-Catarina Pinho-Gomes, Scott McCain, Simon Fleming, Amar Rangan Rhianon Reynolds, Shafaque Sheikh, Joseph Shalhoub, Amy Stimpson, Nicholas Symons. Gijs van Boxel, Malcolm West, Jonathan Wild, Adam Williams